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Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/777,281 | CZYS, BARUCH | |
| | Examiner | Art Unit | |
| | Muthuswamy G. Manoharan | 2687 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *11 February 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-62* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-62* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date .
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1-3, 9-10,20,31,39,40-42,48, and 49 are rejected under 35 U.S.C. 102(b) as being anticipated by Bonaccorso et al. (hereinafter Bonaccorso) (US 2001/0053678).**

Regarding claim 1, Bonaccorco teaches a receiver for use in a wireless network, comprising:

a first antenna (item 112 in Figure 1), which is adapted to be directed toward a first transmitter positioned in a first location (item 104 in Figure 1) and transmitting a first signal carrying a first stream of digital information;

a second antenna (item 114 in Figure 1), which is adapted to be directed toward a second transmitter positioned in a second location (item 106 in Figure 1), separated from the first location, and

transmitting a second signal carrying a second stream of digital information; and

processing circuitry (Figure 2A), which is coupled to receive first and second receiver

inputs from the first and second antennas, respectively, due to reception of the first and second signals by the antennas, and

which is adapted to combine the first and second receiver inputs so as to extract at least the first stream of digital information (Paragraph [0006]) from the receiver inputs while suppressing at least a first interference due to reception of the second signal by the first antenna (Abstract, lines 6-11; Paragraph [0012], lines 2-4).

Regarding claim 2, Bonaccorso teaches the receiver according to claim 1, wherein the first and second signals are transmitted in a common frequency channel (Paragraph [0029], lines 11-12).

Regarding claim 3, Bonaccorso teaches the receiver according to claim 1, wherein the processing circuitry is further adapted to extract the second stream of digital information from the receiver inputs while suppressing a second interference due to the reception of the first signal by the second antenna (Paragraph [0012], lines 2-4).

Regarding claim 9, Bonaccorso teaches the receiver according to claim 1, wherein the receiver comprises a plurality of N antennas, including the first and second antennas, and wherein the processing circuitry is adapted to combine the receiver inputs from the N antennas so as to extract the first stream of digital information while

suppressing up to N-1 interferers, including the first interference (Paragraph [0030], lines 2-6).

Regarding claim 10, Bonaccorso teaches the receiver according to claim 9, wherein the N-1 interferers comprise at least one interference source that is not a transmitter in the wireless network (Paragraph [0048], line 3).

Regarding claim 20, Bonaccorso teaches Communication apparatus (item 110 in Figure 1) for use in a wireless network (Paragraph [0027], lines 1-2), comprising: a first directional antenna (item 112 in Figure 1), which is adapted to be directed toward a first remote antenna of a first node in a first location in the network (item 104 in Figure 1); a second directional antenna (item 114 in Figure 1), which is adapted to be directed toward a second remote antenna of a second node in a second location in the network (item 106 in Figure 1), separated from the first location; signal generation circuitry (Figure 2A), which is coupled to receive first and second streams of digital information to be conveyed to the first and second nodes, respectively, and which is adapted to combine the first and second streams of digital information (Paragraph [0006]) so as to generate first and second outgoing signals for transmission respectively by the first and second directional antennas, such that at least a first interference due to the transmission of the second outgoing signal is suppressed at the first remote antenna; and processing circuitry, which is coupled to receive first and second receiver inputs from the first and second directional antennas, respectively, due to reception of first and second incoming signals by the antennas from the first and second nodes,

respectively, and which is adapted to combine the first and second receiver inputs so as to extract a data stream from the receiver inputs while suppressing at least a second interference due to reception of the second incoming signal by the first directional antenna (Abstract, lines 6-11; Paragraph [0012], lines 2-4).

Regarding claim 31, Bonaccorco teaches a wireless communication network, comprising a plurality of nodes, which comprise at least first and second nodes (items 102 and 110 in Figure 1), wherein each of the first and second nodes comprises a respective first antenna (items 104 and 112 in Figure 1), such that the first antenna of the first node is directed to transmit a first signal carrying a first stream of digital information toward the second node (Paragraph [0027], lines 11-12), and the first antenna of the second node is directed toward the first node so as to receive the first signal (Paragraph [0027], lines 11-12; Figure 1), and wherein at least the second node comprises a second antenna, which is directed toward another of the nodes in the network (item 114 in Figure 1), and wherein the second node comprises processing circuitry, which is coupled to receive first and second receiver inputs from the first and second antennas of the second node (Figure 2A, 2B), respectively, due to reception by the antennas of the second node of the first signal and of at least a second signal transmitted from another of the nodes in the network (Figure 1), and wherein the processing circuitry is adapted to combine the first and second receiver inputs so as to extract at least the first stream of digital information from the receiver inputs while suppressing at least a first interference due to reception of the second signal by the first antenna of the second node (Abstract, lines 6-11; Paragraph [0012], lines 2-4).

Regarding claim 39, Bonaccorso further teaches the network according to claim 31, wherein the second node is configured to receive the first and second signals in a common frequency channel (Paragraph [0029], lines 11-13).

Regarding claim 40, Bonaccorco teaches a **wireless network**, in which a receiving node has a first antenna (item 112 in Figure 1) directed toward a first transmitter positioned in a first location (item 104 in Figure 1) and transmitting a first signal carrying a first stream of digital information, and

a second antenna directed toward a second transmitter positioned in a second location (item 108 in Figure 1), separated from the first location, and transmitting a second signal carrying a second stream of digital information,

**a method** for processing the first and second signals at the receiving node, comprising: receiving first and second receiver inputs from the first and second antennas, respectively, due to reception of the first and second signals by the antennas; and combining the first and second receiver inputs so as to extract at least the first stream of digital information from the receiver inputs while suppressing at least a first interference due to reception of the second signal by the first antenna (Abstract, lines 6-11; Paragraph [0012], lines 2-4).

Regarding claim 41, Bonaccorso teaches the method according to claim 40, wherein the first and second signals are transmitted in a common frequency channel (Paragraph [0029], lines 11-12).

Regarding claim 42, Bonaccorso teaches the method according to claim 40, wherein combining the receiver inputs further comprises extracting the second stream of digital information from the receiver inputs while suppressing a second interference due to the reception of the first signal by the second antenna (Paragraph [0012], lines 2-4).

Regarding claim 48, Bonaccorso teaches the method according to claim 40, wherein the receiving node comprises a plurality of N antennas, including the first and second antennas, and wherein combining the first and second receiver inputs comprises combining the first and second receiver inputs with further inputs from the N antennas so as to extract the first stream of digital information while suppressing up to N-1 interferers, including the first interference (Paragraph [0030], lines 2-6).

Regarding claim 49, Bonaccorso teaches the method according to claim 48, wherein the N-1 interferers comprise at least one interference source that is not a transmitter in the wireless network (Paragraph [0048], line 3).

**Claims 11-16, 19, 21,30,52,53-57, 60 and 61 are rejected under 35 U.S.C. 102(b) as being anticipated by Gerlach et al. (hereinafter Gerlach) (US 5634199).**

Regarding claim 11, Gerlach teaches a **transmitter** for use in a wireless network, comprising: a first antenna, which is adapted to be directed toward a first receiver positioned in a first location (Figure 1);

a second antenna, which is adapted to be directed toward a second receiver positioned in a second location, separated from the first location (Figure 1);

and signal generation circuitry (Figure 2), which is coupled to receive first and second streams of digital information to be conveyed to the first and second receivers, respectively, and which is adapted to combine the first and second streams of digital information so as to generate first and second signals for transmission respectively by the first and second antennas, such that at least a first interference due to the transmission of the second signal is suppressed at the first receiver (Abstract lines 1-5).

Regarding claims 12 Gerlach teaches the network according to claim 21,wherein the signal generation circuit is adapted to generate the first and second signals for transmission in a common frequency channel (Col.3, lines 43-46).

Regarding claim 13, Gerlach teaches the transmitter according to claim 11, wherein the signal generation circuitry is adapted to generate the first and second signals so that a second interference associated with the transmission of the first signal is suppressed at the second receiver (Abstract, lines 1-5).

Regarding claim 14, Gerlach teaches the transmitter according to claim 11, wherein the signal generation circuitry is adapted to determine a channel transfer function (Col. 5, line 21; Equation 7) between the first and second antennas and at least one of the first and second receivers, to determine coefficients based on the channel transfer function ("weight vector", Col. 5, lines 1-65), and to apply the coefficients to the first and second streams of digital information in order to generate

the first and second signals so as to suppress the interference (Col. 5, lines 63-67 and col. 6, lines 1-60).

Regarding claim 15, Gerlach teaches the transmitter according to claim 14, wherein the signal generation circuitry is adapted to generate training signals for transmission to the first and second receivers, for use in determining the channel transfer function (Abstract, lines 1-7).

Regarding claim 16, Gerlach teaches the transmitter according to claim 15, and comprising a return channel receiver, for receiving data associated with the coefficients from the first and second receivers in response to reception of the training signals at the first and second receivers (Col. 3, lines 13-15).

Regarding claim 19, Gerlach teaches the transmitter according to claim 11, wherein the transmitter comprises a plurality of M antennas (Figure 1), including the first and second antennas, and wherein the signal generation circuitry is adapted to combine up to M streams of digital information so as to generate up to M signals for transmission respectively by the M antennas, such that up to M-1 interferers due to the transmission of the up to M signals, including the first interference, are suppressed at the first receiver (Abstract, lines 1-6).

Regarding claim 21, Gerlach teaches a wireless communication network, comprising a plurality of nodes (Figure 1), which comprise at least first and second nodes (Figure 1), wherein each of the first and second nodes comprises a respective

first antenna, such that the first antenna of the first node is directed to transmit a first signal toward the second node (Figure 1), and

the first antenna of the second node is directed toward the first node so as to receive the first signal (Figure 1),

and wherein at least the first node comprises a respective second antenna, which is directed toward another of the nodes in the network (Figure 1), and

wherein the first node comprises signal generation circuitry (Figure 2), which is coupled to receive a first stream of digital information to be conveyed to the second node and a second stream of digital information to be conveyed to another of the nodes, and wherein the signal generation circuitry is adapted to combine the first and second streams of digital information so as to generate the first signal and to generate a second signal for transmission by the second antenna of the first node, such that at least a first interference due to the transmission of the second signal is suppressed at the second node (Abstract, lines 1-7; Col. 5, lines 63-67, Col. 6, lines 1-3).

Claim 30 is rejected for the same reasons as set forth in claim 12.

Regarding claim 52, Gerlach teaches a **wireless network**, in which a transmitting node has a first antenna directed toward a first receiver positioned in a first location (Figure 1), and a second antenna directed toward a second receiver positioned in a second location, separated from the first location (Figure 1), **a method** for generating signals for transmission by the transmitting node (Figure 2), comprising:

receiving first and second streams of digital information to be conveyed to the first and second receivers, respectively; and combining the first and second streams of digital information so as to generate first and second signals for transmission respectively by the first and second antennas, such that at least a first interference due to the transmission of the second signal is suppressed at the first receiver (Abstract, lines 1-5).

Claim 53 is rejected for the same reasons as set forth in claim 12.

Regarding claim 54, Gerlach teaches the method according to claim 52, wherein combining the first and second streams of digital information comprises generating the first and second signals so that a second interference associated with the transmission of the first signal is suppressed at the second receiver (Abstract, lines 1-5).

Claims 55-57 are rejected for the same reasons as set forth in claims 14-16 respectively.

Regarding claim 60, Gerlach teaches the method according to claim 52, wherein the transmitting node comprises a plurality of M antennas, including the first and second antennas, and wherein combining the first and second streams of digital information comprises combining the first and second streams with further streams of digital information so as to generate up to M signals for transmission respectively by the M antennas, such that up to M-1 interferers due to the transmission of the up to M

signals, including the first interference, are suppressed at the first receiver (Abstract, lines 1-6).

Regarding claim 61, Gerlach further teaches the method according to claim 52, wherein combining the first and second streams of digital information comprises generating the first and second signals in accordance with a multiplexing scheme (Col. 1, lines 10—12), so that multiple receivers in the network, including the first and second receivers, are served by each of the first and second antennas of the transmitting node.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

**Claims 4-8, and 43-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonaccorso et al. (hereinafter Bonaccorso) (US 2001/0053678) in view of Paulraj et al. (hereinafter Paulraj) (US 6377636).**

Regarding claim 4, Bonaccorso teaches the receiver according to claim 1, wherein the processing circuitry is adapted to estimate an error in the extracted stream of digital information, to determine coefficients in response to the estimated error, and

to apply the coefficients to the first and second receiver inputs in order to suppress the interference (Paragraph [0031], lines 1-3;Paragraph [0042], lines 13-19; Paragraph [0053], lines 1-10). Bonaccorso did not teach expressly determine coefficients in response to the estimated error. However, Paulraj teaches in an analogous art, determine coefficients in response to the estimated error (Col. 2, lines 47-57; Col. 13, lines 24-32). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to determine coefficients in response to the estimated error so as to suppress the interference.

Regarding claim 5, Bonaccorso teaches the receiver according to claim 4, wherein the processing circuit is adapted to determine the coefficients so as to minimize a mean square of the error (Paragraph [0042], lines 13-19; Paragraph [0053], lines 1-10). Bonaccorso did not teach expressly determine the coefficients so as to minimize a mean square of the error. However, Paulraj teaches in an analogous art, wherein the processing circuit is adapted to determine the coefficients so as to minimize a mean square of the error (Col. 2, lines 47-57; Col. 13, lines 24-32). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the processing circuit is adapted to determine the coefficients so as to minimize a mean square of the error.

Regarding claim 6, Bonaccorso further teaches the receiver according to claim 4, wherein the processing circuitry is adapted to adjust the coefficients adaptively, in response to a change in a channel transfer function (Paragraph [0047], lines 1-3)

between at least one of the first and second transmitters and at least one of the first and second antennas (Paragraph [0049-0062]).

Regarding claims 7 and 46, Bonaccorso teaches all the particulars of the claim, except wherein the first and second signals comprise multi-carrier signals, and wherein the processing circuitry is adapted to divide the first and second receiver inputs into multiple frequency components, and to determine the coefficients to be applied individually to each of the frequency components. However, Paulraj teaches in an analogous art, the first and second signals comprise multi-carrier signals, and wherein the processing circuitry is adapted to divide the first and second receiver inputs into multiple frequency components, and to determine the coefficients to be applied individually to each of the frequency components (Figure 11; Col. 13, lines 57-61). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the first and second signals comprise multi-carrier signals, and wherein the processing circuitry is adapted to divide the first and second receiver inputs into multiple frequency components, and to determine the coefficients to be applied individually to each of the frequency components. This modification provides spectral efficiency.

Regarding claim 8 and 47, Bonaccorso teaches all the particulars of the claim except wherein the processing circuitry comprises a tap-delay channel equalizer. However, Paulraj teaches in an analogous art wherein the processing circuitry comprises a tap-delay channel equalizer (Figure 10B; Col. 13, lines 25-32). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the

processing circuitry comprises a tap-delay channel equalizer. This modification helps in suppressing the interfering signals to obtain the desired signals.

Claims 43 –45 are rejected for the same reasons as set forth in claims 4-6 respectively.

**Claims 17 and 18 are rejected under 35 U.S.C. 102(b) as being unpatentable over Gerlach et al. (hereinafter Gerlach) (US 5634199) in view of Paulraj et al. (hereinafter Paulraj) (US 6377636).**

Regarding claim 17, Gerlach teaches all the particulars of the claim except, wherein the first and second signals comprise multi-carrier signals, and wherein the signal generation circuitry is adapted to generate multiple frequency components of the signals, and to determine the coefficients to be applied individually to each of the frequency components. However, Paulraj teaches in an analogous art, the first and second signals comprise multi-carrier signals, and wherein the signal generation circuitry is adapted to generate multiple frequency components of the signals, and to determine the coefficients to be applied individually to each of the frequency components (Figure 11; Col. 13, lines 57-61). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the first and second signals comprise multi-carrier signals, and wherein the signal generation circuitry is adapted to generate multiple frequency components of the signals, and to determine the coefficients to be applied individually to each of the frequency components. . This modification provides spectral efficiency.

Regarding claim 18, Gerlach teaches all the particulars of the claim except, wherein the first and second signals comprise single-carrier signals, and wherein the signal generation circuitry comprises a tap-delay channel pre-equalizer. Hwoever, Paulraj teaches in an analogous art, the first and second signals comprise single-carrier signals, and wherein the signal generation circuitry comprises a tap-delay channel pre-equalizer (Figure 10B; Col. 13, lines 25-32). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to use the first and second signals comprise single-carrier signals, and wherein the signal generation circuitry comprises a tap-delay channel pre-equalizer. This modification helps in suppressing the interfering signals to obtain the desired signals.

**Claims 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerlach et al. (hereinafter Gerlach) (US 5634199) in view of Naguib (US 2003/0086479).**

Regarding claim 22, Gerlach teaches all the particulars of the claim 21. Gerlach did not teach explicitly, the second node comprises a respective second antenna and processing circuitry, which is coupled to receive first and second receiver inputs from the first and second antennas of the second node, respectively, due to reception by the antennas of the second node of the first signal and of at least a third signal transmitted from another of the nodes in the network, and wherein the processing circuitry is

adapted to combine the first and second receiver inputs so as to extract at least the first stream of digital information from the receiver inputs while suppressing at least a second interference due to reception of the third signal by the first antenna of the second node. However, Naguib teaches in an analogous art, the second node (item 40 in Figure 1) comprises a respective second antenna and processing circuitry (Figure 4a-4c), which is coupled to receive first and second receiver inputs from the first and second antennas of the second node (items 42 and 44 in Figure 1), respectively, due to reception by the antennas of the second node of the first signal and of at least a third signal transmitted from another of the nodes in the network (Figure 1; Paragraph [0034], lines 1-14), and wherein the processing circuitry is adapted to combine the first and second receiver inputs so as to extract at least the first stream of digital information from the receiver inputs while suppressing at least a second interference due to reception of the third signal by the first antenna of the second node (Paragraph [0049; lines 1-3). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the second node comprises a respective second antenna and processing circuitry, which is coupled to receive first and second receiver inputs from the first and second antennas of the second node, respectively, due to reception by the antennas of the second node of the first signal and of at least a third signal transmitted from another of the nodes in the network, and wherein the processing circuitry is adapted to combine the first and second receiver inputs so as to extract at least the first stream of digital information from the receiver inputs while suppressing at least a second interference due to reception of the third signal by the first antenna of the

second node. This helps to overcome the limitation of signal reception due to interference of other transmitters.

**Claims 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerlach et al. (hereinafter Gerlach) (US 5634199) in view of Naguib (US 2003/0086479). And further in view of Madhow et al. (hereinafter Madhow) (US 6426973).**

Regarding claim 23, Gerlach in view of Naguib teaches all the particulars of the claim 22 except, wherein the first and second nodes are adapted to suppress at least the first and second interferences substantially without dependence on synchronization between the nodes in the network. However, Madhow teaches in an analogous art teaches the first and second nodes are adapted to suppress at least the first and second interferences substantially without dependence on synchronization between the nodes in the network (Col. 10, lines 6-10). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the first and second nodes are adapted to suppress at least the first and second interferences substantially without dependence on synchronization between the nodes in the network. This modification makes the nodes in the network less complex.

**Claims 32, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonaccorso et al. (hereinafter Bonaccorso) (US 2001/0053678) in view of Madhow et al. (hereinafter Madhow) (US 6426973).**

Regarding claims 32 and 51, Bonaccorso teaches all the particulars of the claim, except wherein the second node is adapted to suppress at least the first interference substantially without dependence on synchronization between the nodes in the network. However, Madhow teaches in an analogous art, wherein the second node is adapted to suppress at least the first interference substantially without dependence on synchronization between the nodes in the network (Col. 10, lines 6-10). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to have the second node is adapted to suppress at least the first interference substantially without dependence on synchronization between the nodes in the network. This modification makes the nodes in the network less complex.

**Claims 24-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerlach et al. (hereinafter Gerlach) (US 5634199) in view of Williams et al. (hereinafter Williams) (US 6415245).**

Regarding claim 24, Gerlach teaches all the particulars of the claim except a first subset of the nodes are arranged in a ring topology. However, Williams teaches in an analogous art, first subset of the nodes are arranged in a ring topology (Col. 12, lines 13-15). Therefore, it would be obvious to one of ordinary skill in the art to have first

subset of the nodes are arranged in a ring topology. The repetitive nature of the network makes the analysis simpler.

Regarding claim 34, Gerlach teaches all the particulars of the claim except wherein at least one of the nodes in the first subset is connected by a wireless link to another one of the nodes in a second subset of the nodes, which are not a part of the ring topology of the first subset. However, Williams teaches in an analogous art, wherein at least one of the nodes in the first subset is connected by a wireless link to another one of the nodes in a second subset of the nodes, which are not a part of the ring topology of the first subset (Col. 12, lines 13-15). Therefore, it would be obvious to one of ordinary skill in the art to have the first subset is connected by a wireless link to another one of the nodes in a second subset of the nodes, which are not a part of the ring topology of the first subset. The repetitive nature of the network makes the analysis simpler.

Regarding claim 26, Gerlach teaches all the particulars of the claim except a first subset of the nodes are arranged in a mesh topology. However, Williams teaches in an analogous art, first subset of the nodes are arranged in a mesh topology (Col. 12, lines 13-15). Therefore, it would be obvious to one of ordinary skill in the art to have first subset of the nodes are arranged in a mesh topology. The repetitive nature of the network makes the analysis simpler.

Regarding claim 27, Gerlach teaches all the particulars of the claim except, wherein the nodes are arranged in a star topology. However, Williams teaches in an analogous art, wherein the nodes are arranged in a star topology and wherein the second node is located at the hub of the star topology (Col. 12, lines 13-15). Therefore, it would be obvious to one of ordinary skill in the art to have the nodes are arranged in a star topology and wherein the second node is located at the hub of the star topology. The repetitive nature of the network makes the analysis simpler.

Regarding claim 28, Gerlach teaches, the network according to claim 21, wherein the signal generation circuitry is adapted to generate the first and second signals in accordance with a multiplexing scheme (Col. 1, lines 10-12), so that the first antenna of the first node serves multiple nodes in the network, including the second node, are served by the first antenna of the first node.

Regarding claim 29, Gerlach teaches, wherein the multiplexing scheme is selected from a group of schemes consisting of TDMA and CDMA (Col. 1, lines 10—12).

**Claims 33-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonaccorso et al. (hereinafter Bonaccorso) (US 2001/0053678) in view of Williams et al. (hereinafter Williams) (US 6415245).**

Regarding claim 33, Bonaccorso teaches all the particulars of the claim except a first subset of the nodes are arranged in a ring topology. However, Williams teaches in

an analogous art, first subset of the nodes are arranged in a ring topology (Col. 12, lines 13-15). Therefore, it would be obvious to one of ordinary skill in the art to have first subset of the nodes are arranged in a ring topology. The repetitive nature of the network makes the analysis simpler.

Regarding claim 34, Bonaccorso teaches all the particulars of the claim except wherein at least one of the nodes in the first subset is connected by a wireless link to another one of the nodes in a second subset of the nodes, which are not a part of the ring topology of the first subset. However, Williams teaches in an analogous art, wherein at least one of the nodes in the first subset is connected by a wireless link to another one of the nodes in a second subset of the nodes, which are not a part of the ring topology of the first subset (Col. 12, lines 13-15). Therefore, it would be obvious to one of ordinary skill in the art to have the first subset is connected by a wireless link to another one of the nodes in a second subset of the nodes, which are not a part of the ring topology of the first subset. The repetitive nature of the network makes the analysis simpler.

Regarding claim 35, Bonaccorso teaches all the particulars of the claim except a first subset of the nodes are arranged in a mesh topology. However, Williams teaches in an analogous art, first subset of the nodes are arranged in a mesh topology (Col. 12, lines 13-15). Therefore, it would be obvious to one of ordinary skill in the art to have

first subset of the nodes are arranged in a mesh topology. The repetitive nature of the network makes the analysis simpler.

Regarding claim 36, Bonaccorso teaches all the particulars of the claim except, wherein the nodes are arranged in a star topology and wherein the second node is located at a hub of the star topology. However, Williams teaches in an analogous art, wherein the nodes are arranged in a star topology and wherein the second node is located at a hub of the star topology (Col. 12, lines 13-15). Therefore, it would be obvious to one of ordinary skill in the art to have the nodes are arranged in a star topology and wherein the second node is located at a hub of the star topology. The repetitive nature of the network makes the analysis simpler.

Regarding claim 37, Bonaccorso teaches the network according to claim 36, wherein the processing circuitry is adapted to receive the first and second receiver inputs in accordance with a multiplexing scheme (Figure 2A), so that multiple nodes in the network, including the first node, are served by the first antenna of the second node.

Regarding claim 38, Bonaccorso further teaches the multiplexing scheme is selected from a group of schemes consisting of TDMA, CDMA and ALOHA (Paragraph [0006], lines 1-8).

Claim 50 is rejected for the same reasons as set forth in claim 37.

Claims 58-59 are rejected for the same reasons as set forth in claims 17-18 respectively.

**Claim 62 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerlach et al. (hereinafter Gerlach) (US 5634199) in view of Madhow et al. (hereinafter Madhow) (US 6426973).**

Regarding claim 62, Gerlach teaches all the particulars of the claim, except wherein combining the first and second streams of digital information comprises suppressing at least the first interference substantially without dependence on synchronization between the transmitting node and the receivers. However, Madhow teaches in an analogous art, wherein combining the first and second streams of digital information comprises suppressing at least the first interference substantially without dependence on synchronization between the transmitting node and the receivers (Col. 10, lines 6-10). Therefore, it would be obvious to one of ordinary skill in the art at the time of invention to combine the first and second streams of digital information comprises suppressing at least the first interference substantially without dependence on synchronization between the transmitting node and the receivers. This modification makes the nodes in the network less complex.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gesbert et al. (US 6377819) teach base stations and transceivers having multiple antennas.

Muramoto et al. (US 2001/0055970) teach radio system that enables effective reuse of frequencies without the occurrence of interference.

Gerlach et al. (US 5471647) teach method for multiplexing signals transmitted from an antenna array to multiple receivers and in particular to the use of feedback from the receivers to minimize cross-talk among the received signals.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Muthuswamy G. Manoharan whose telephone number is 571-272-5515. The examiner can normally be reached on 7:30AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on 571-272-7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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PRIMARY EXAMINER
2-28-2006